TABLE 5.3. Equation of Center of the Sun

Mean Anomaly	Equation of Center	Mean Anomaly	Equation of Center
0° (360)	−(+) 0° 0′	90° (270)	−(+) 1°55′
5° (355)	0°10′	95° (265)	1°55′
10° (350)	0°19′	100° (260)	1°54′
15° (345)	0°29′	105° (255)	1°52′
20° (340)	0°38′	110° (250)	1°49′
25° (335)	0°47′	115° (245)	1°46′
30° (330)	0°56′	120° (240)	1°41′
35° (325)	1°04′	125° (235)	1°36′
40° (320)	1°12′	130° (230)	1°30′
45° (315)	1°19′	135° (225)	1°23′
50° (310)	1°26′	140° (220)	1°16′
55° (305)	1°32′	145° (215)	1°08′
60° (300)	1°38′	150° (210)	0°59′
65° (295)	1°43′	155° (205)	——
70° (290)	1°47′	160° (200)	——
75° (285)	1°50′	165° (195)	——
80° (280)	1°52′	170° (190)	——
85° (275)	1°54′	175° (185)	——
90° (270)	1°55′	180° (180)	——

1900 January 0.5 Greenwich mean time (= J.D. 241 5020.0). The result is Δt, the number of days elapsed since epoch.

2. Finding the mean longitude: Enter table 5.1 with the digit for each power of 10 in Δt and take out the corresponding motion. Take out also the motion for the hours and minutes, if required. The total mean motion is the sum of all. The total mean motion is positive if the date is after the epoch and negative if it is before. Add the mean motion to the mean longitude at epoch (279°42′) and subtract as many multiples of 360° as required to render the quantity less than 360°. Round to the nearest minute of arc. The result is the Sun's mean longitude $\bar{\lambda}$ at the required date.

3. Longitude of the apogee and mean anomaly: Enter table 5.2 with the century year immediately before the required year. For example, for A.D. 1583, use 1500; for 183 B.C., use 201 B.C. Then correct this longitude by the motion of the apogee during the interval from the century year to the required year. It is sufficient to work to the nearest decade. For example, for A.D. 1583, add 80 years' motion. If the table is handled in this way, the motion for the decades elapsed will always be added positively to the value for the century. The sum is the longitude A of the solar apogee. Calculate the mean anomaly $\bar{\alpha}$ by subtracting A from the mean longitude:

$$\bar{\alpha} = \bar{\lambda} - A.$$

If $\bar{\alpha}$ should turn out negative, add 360°.

4. Equation of center: Enter table 5.3 with the mean anomaly and take out the equation of center q. Here, the interpolation should be done with care to determine the equation to the nearest minute of arc. Note that the equation is negative if the anomaly is between 0° and 180° and positive if the anomaly is between 180° and 360°.

5. Add the equation of center to the mean longitude. (The tables have been set up so that one always adds. But the sign of q may be either positive or negative, as listed in table 5.3.) The result is the longitude of the Sun that was sought:

$$\lambda = \bar{\lambda} + q.$$

TABLE 5.1. The Sun's Mean Motion.

Days	Motion	Days	Motion	Days	Motion
100,000	284°44.0′	10,000	136°28.4′	1,000	———
200,000	209°28.0′	20,000	272°56.8′	2,000	———
300,000	134°12.0′	30,000	49°25.2′	3,000	———
400,000	58°56.0′	40,000	185°53.6′	4,000	———
500,000	343°40.1′	50,000	322°22.0′	5,000	———
600,000	268°24.1′	60,000	98°50.4′	6,000	153°53.0′
700,000	193°08.1′	70,000	235°18.8′	7,000	59°31.9′
800,000	117°52.1′	80,000	11°47.2′	8,000	325°10.7′
900,000	42°36.1′	90,000	148°15.6′	9,000	230°49.6′
100	———	10	9°51.4′	1	0°59.1′
200	———	20	19°42.8′	2	1°58.3′
300	———	30	29°34.2′	3	2°57.4′
400	———	40	39°25.6′	4	3°56.6′
500	———	50	49°16.9′	5	4°55.7′
600	231°23.3′	60	59°08.3′	6	5°54.8′
700	329°57.2′	70	68°59.7′	7	6°54.0
800	68°31.1′	80	78°51.1′	8	7°53.1′
900	167°05.0′	90	88°42.5′	9	8°52.2′
Hours	Motion	Hours	Motion	Minutes	Motion
1	0°02.5′	13	0°32.0′	10	0°0.4′
2	0°04.9′	14	0°34.5′	20	0°0.8′
3	0°07.4′	15	0°37.0′	30	0°1.2′
4	0°09.8′	16	0°39.4′	40	0°1.6′
5	0°12.3′	17	0°41.9′	50	0°2.1′
6	0°14.8′	18	0°44.4′	60	0°2.5′
7	0°17.2′	19	0°46.8′		
8	0°19.7′	20	0°49.3′		
9	0°22.2′	21	0°51.7′		
10	0°24.6′	22	0°54.2′		
11	0°27.1′	23	0°56.7′		
12	0°29.6′	24	0°59.1′		

Epoch 1900 Jan 0.5 ET = J.D. 241 5020.0 (noon at Greenwich).
Mean longitude at epoch = 279°42′.

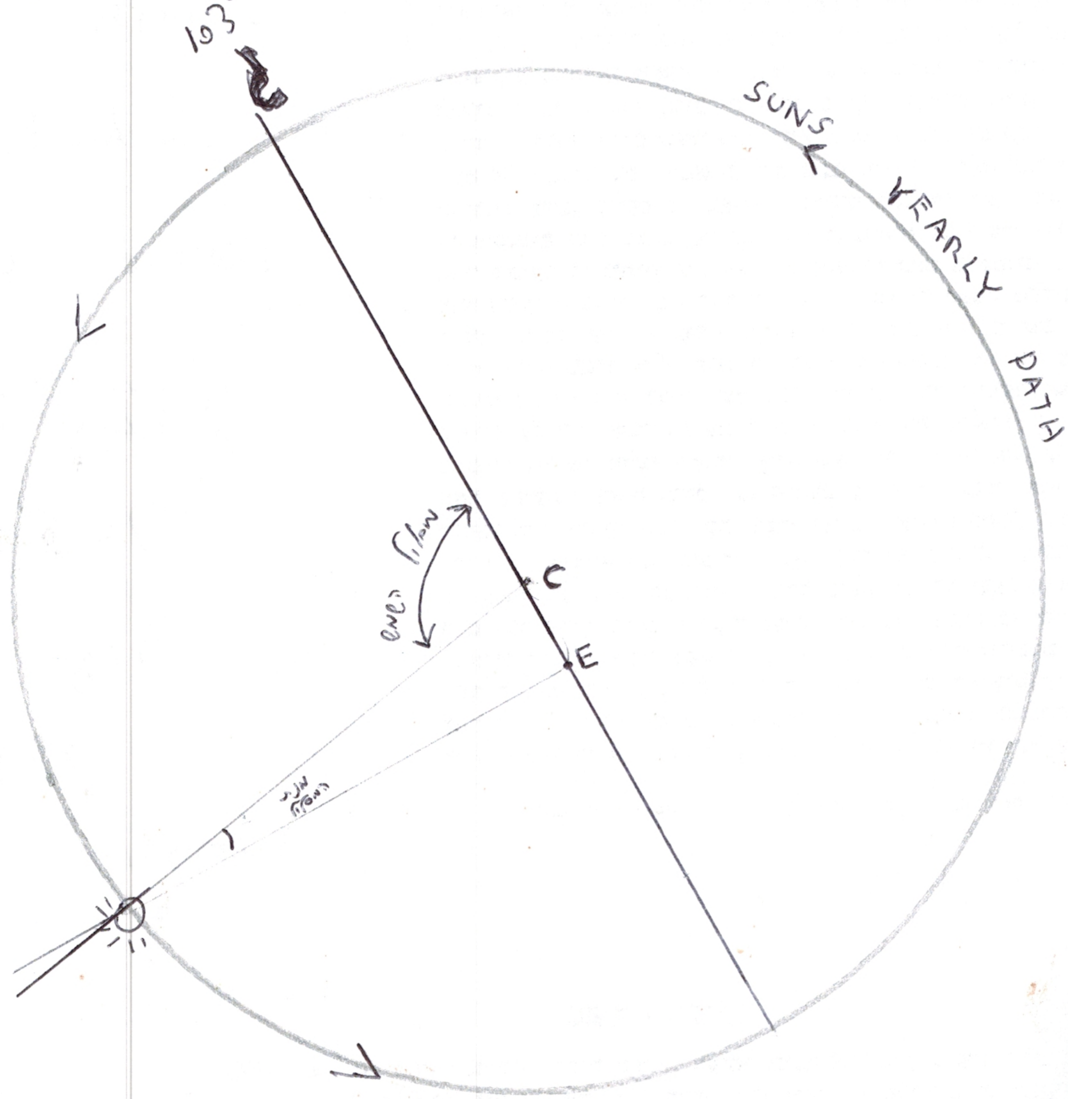
etry—have been done by the compiler of the tables. In the days before the hand calculator, such tables offered the user great savings in labor.

Precepts for the Use of the Tables of the Sun

1. Determine the Julian day number of the moment for which the Sun's longitude is desired. Subtract from this the Julian day number of the epoch,

TABLE 5.2. Longitude of the Solar Apogee

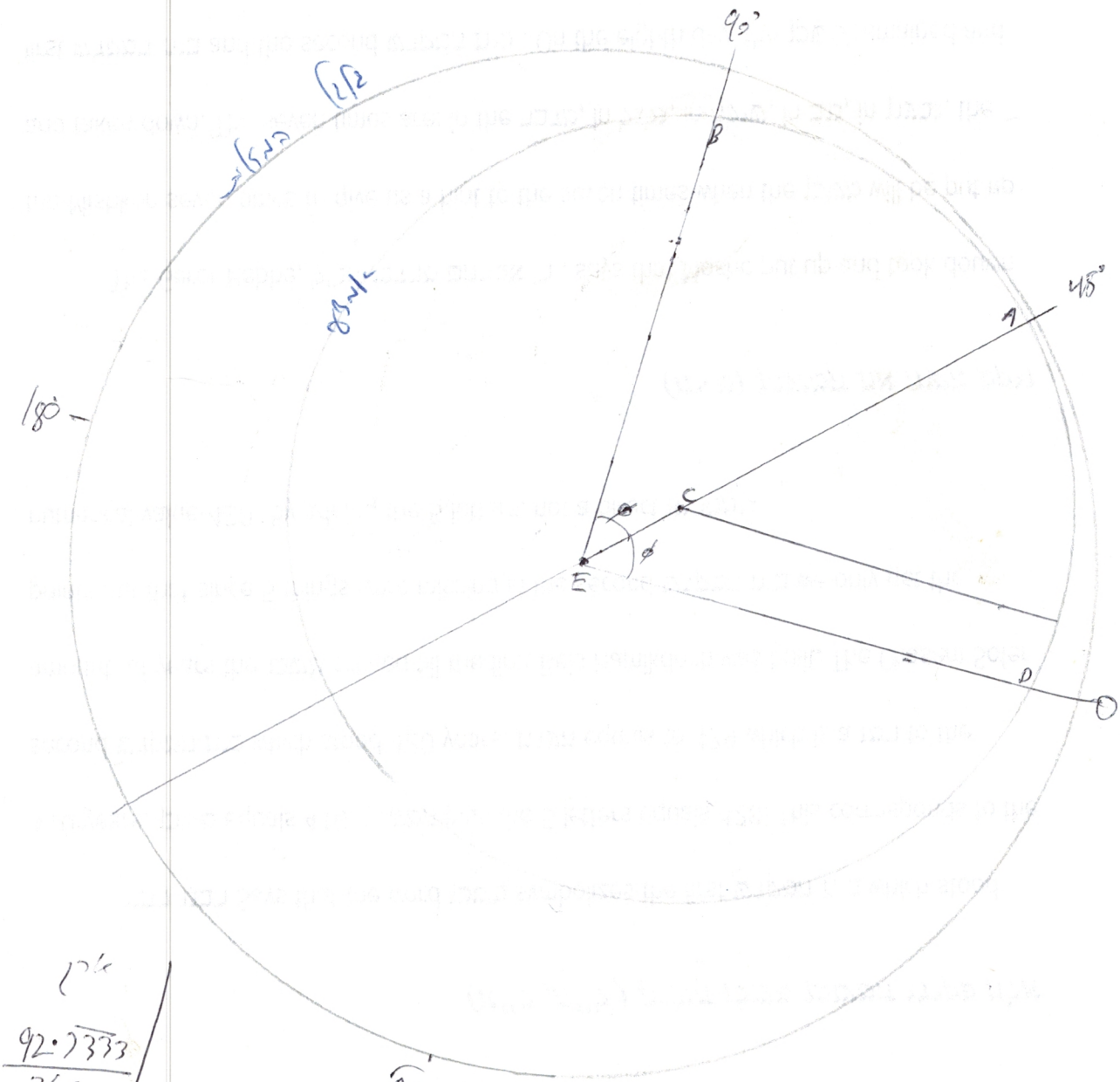
Year	Longitude	Year	Longitude	Year	Longitude	Ten-Year Intervals	Motion
801 B.C.	53°57′	200 A.D.	71°25′	1200 A.D.	———	10	0°10′
701	55°42′	300	73°10′	1300	———	20	0°21′
601	57°27′	400	74°55′	1400	———	30	0°31′
501	59°12′	500	76°40′	1500	———	40	0°42′
401	60°57′	600	78°24′	1600	———	50	0°52′
301	62°41′	700	80°09′	1700	97°37′	60	1°03′
201	64°26′	800	81°54′	1800	99°21′	70	1°13′
101	66°11	900	83°39′	1900	101°06′	80	1°24′
1 B.C.	67°56′	1000	85°23′	2000	102°51′	90	1°34′
100 A.D.	69°40′	1100	87°08′	2100	104°36′		


103°
SUNS YEARLY PATH
C
E

91 D	7½ h	91.3125	
94 D	2 h	94.08569	
88 D	12 h	88.54	

Earth = E

center of Sun = C



$\overline{AB} = 46° 22'$

$\phi = 45°$

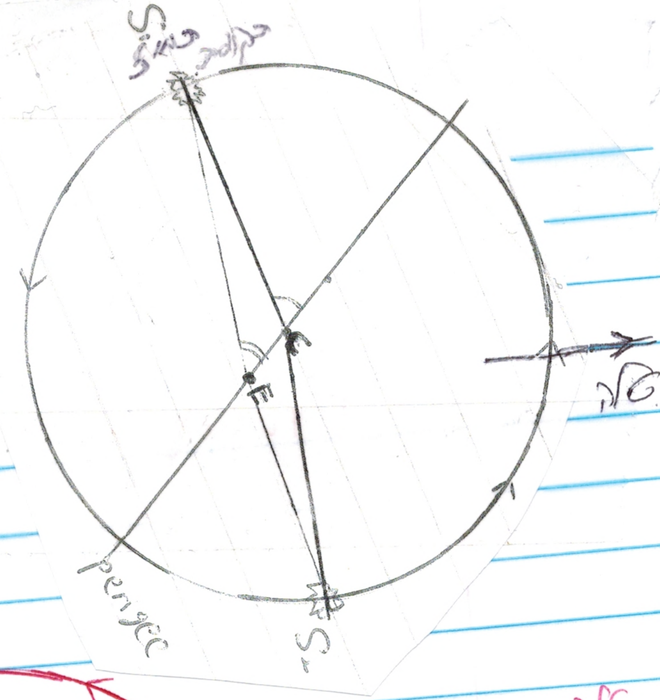
$\overline{AD} = 46° 22'$

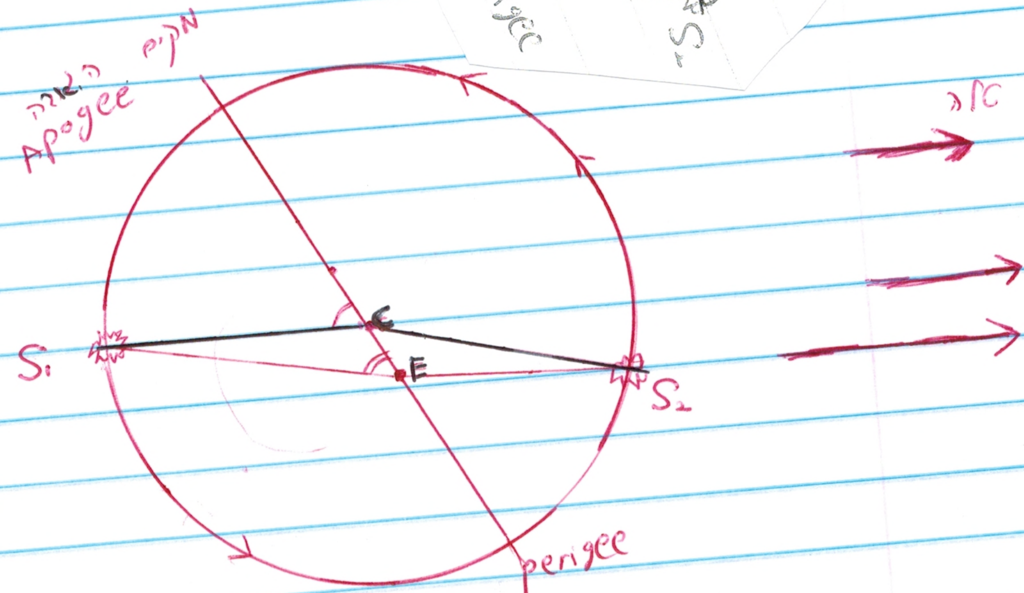
$45° + 46° 22' = 92° 44'$

$365.25 \times \frac{92.7333}{360°} = 94.08569\ldots$

94 days

כי תקופת ניסן הכי אחרונה
שבשנה של 45
לא היה בזמן יוליאן!!





Epoch
2000

Apogee 2007 = 103°

Apogee [illegible] = 46°

mean motion = .9856472° per day

Ms, epoch = 280.461

C = center of suns path

E = Earth

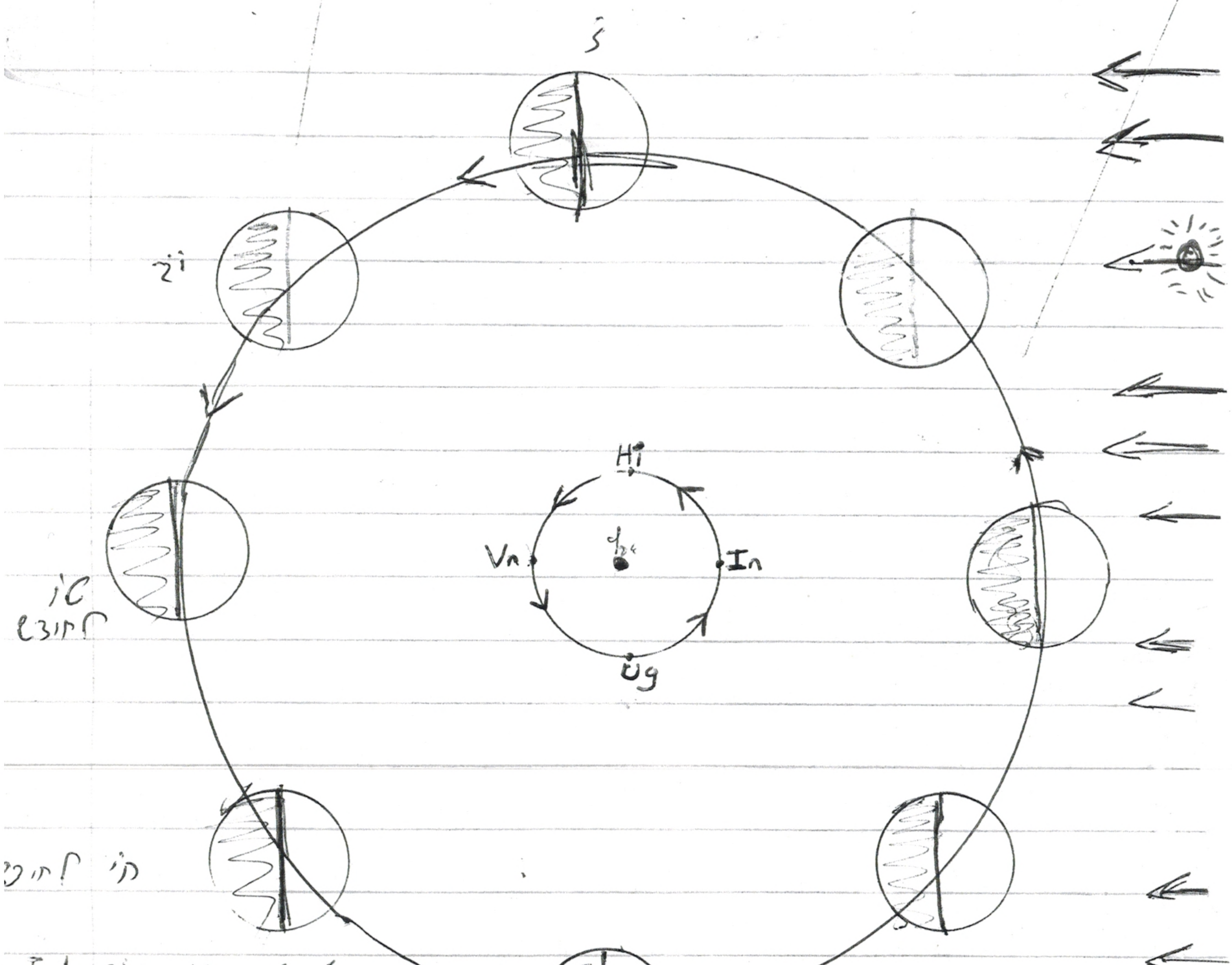
S_1 = Suns true longitude < mean longitude

S_2 = Suns " " > " "

13.176388°		
27.321548	=	360°
29.5306	=	389.1...
.9856473 35	=	
29.5306	=	29.1

13.065°

385.8173



Indonesia 12am

Hawii 6pm

Venozal.

Uganda 6am